UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/565,714	10/30/2006	Hitoshi Tsunashima	B-5876PCT 623210-0	7928

36716   7590   06/17/2008
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EXAMINER
BITAR, NANCY

ART UNIT	PAPER NUMBER
2624	

MAIL DATE	DELIVERY MODE
06/17/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on *1/24/2006*.
2a) ☐ This action is **FINAL**.   2b) ☒ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) *1-10* is/are pending in the application.
     4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) *1-10* is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.
10) ☒ The drawing(s) filed on *24 January 2006* is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
     a) ☒ All   b) ☐ Some *   c) ☐ None of:
       1. ☒ Certified copies of the priority documents have been received.
       2. ☐ Certified copies of the priority documents have been received in Application No. _____.
       3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
     * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
     Paper No(s)/Mail Date *4/2/08, 10/10/07*.

4) ☐ Interview Summary (PTO-413)
     Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____ .

DETAILED ACTION

Drawings

1.   Figure 1 should be designated by a legend such as --Prior Art-- because only that which is

old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR

1.121(d) are required in reply to the Office action to avoid abandonment of the application. The

replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR

1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted

by the examiner, the applicant will be notified and informed of any required corrective action in

the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 103

2.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in
> section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are
> such that the subject matter as a whole would have been obvious at the time the invention was made to a person
> having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the
> manner in which the invention was made.

3.   Claims 1-3, 5-6, 8-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over

Crawford et al (US 4,905,148) in view of Summer et al (US 6,556,696).

4.   As to claim 1, Crawford et al teaches an image processing method which processes

 3-dimensional CT data obtained from a 3-dimensional object and being 3-dimensional voxel

data, the 3-dimensional object composed of a single block, the image processing method

comprising: a start point setting step of setting a start point of continuity in the 3-dimensional CT

data to the single block (figure 1);and a continuity detecting step of detecting the 3-dimensional

CT data having continuity with the start point set in the start point setting step (col 6, lines 7-

30), wherein the 3-dimensional CT data are rearranged based on the 3-dimensional CT data

having the continuity detected in the continuity detecting step (Voxel modification is

accomplished by applying connectivity to the unwanted objects. Any voxel identified in this step

of connectivity is given a modified value that will not satisfy the connectivity criterion when

connectivity is applied to the object-of-interest. A further aspect of the method is that the criteria

for connectivity of the unwanted (non-object) voxels and the object voxels are different, Col 5,

lines39-46). While Crawford et al meets a number of the limitations of the claimed invention, as

pointed out more fully above, Crawford et al fails to specifically teach the rearrangement having

the continuity detecting of the three-dimensional voxel data. Specifically, Befu et al. teaches

three-dimensional display processor 106 generates, based on the data in the three-dimensional

image memory 102 and data output from the filter 105, three-dimensional image data of the

extraction region at an arbitrary extraction point so as to store the image data in a VRAM 10.

The data is displayed as a three-dimensional display image on a CRT 108. Note that the

extraction process of the region growing operation for the three-dimensional voxel data is

continuously monitored on a three-dimensional display image such that when the expansion

point enters a region other than an objective region, the region expansion is immediately stopped

so as to delete the region by a function to correct three-dimensional voxel data in reference to

extraction history data of an expansion starting point and points adjacent thereto. When an

extraction stage of the expansion starting point is less than that of the adjacent point by one, the

adjacent point is set as a new expansion starting point. (See also figure 17). It would have been

obvious to one of ordinary skill in the art to rearrange the 3D data based on the continuity of the

detected 3D data in Crawford in order to provide a high speed image processing method to create

a low noise and clear image to the operator. .Therefore, the claimed invention would have been

obvious to one of ordinary skill in the art at the time of the invention by applicant.

As to claim 2, Crawford et al teaches an image processing method which processes 3-

dimensional CT data obtained from a 3-dimensional object and being 3-dimensional voxel data,

the 3-dimensional object composed of a plurality of blocks in a predetermined area of the

3-dimensional object, the image processing method comprising: a start point setting step of

setting, for each of the plurality of blocks, a start point of continuity in the 3-dimensional CT

data to the block concerned; and a continuity detecting step of detecting, for each of the plurality

of blocks, (three –dimensional tomographic data set including a plurality of voxel data points,

col 3, lines 55-65), the 3-dimensional CT data having continuity with the start point set in the

start point setting step (a tomographic array of cubes defined by nodes 14 connected by edges 16

where each node represents a signal of amplitude of a voxel of tomographic data, col 4, lines 51-

61) wherein the 3-dimensional CT data are rearranged based on the 3-dimensional CT data

having the continuity detected in the continuity detecting step (figure 6).

As to claim 3 and 6, Crawford et al teaches the image processing method according to

claim 1 wherein the detection of continuity in the continuity detecting step is performed per

surface or per point (FIG. 1 represents a portion of an array of tomographic data from which a

surface is to be extracted, note that the surface of interest is represented by the union of a large

number of directed points. The directed points are obtained by considering in turn each set of

eight cubically adjacent voxels in the data base of contiguous slices., see figures 2and 4).

5.   Claims 4 and 7, 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over

Crawford et al (US 4,905,148) in view of Summer et al (US 6,556,696) and further in view of

Befu et al (US 7,067,837).

The limitation of claims 4 and 7 has been addressed above except for the following: Befu

et al teaches the predetermined area is a jaw joint part and the plurality of blocks include a

mandibular condyle head and a mandibular fossa (figure 3). It would have been obvious to one

of ordinary skill in the art to conceive of configuring so that the three-dimensional object is

either a head or a fossa of the mandibular joint in order to obtain a clear 3-dimensional image

even when using an x-ray radiation thus receiving accurate dental images. Therefore, the claimed

invention would have been obvious to one of ordinary skill in the art at the time of the invention

by applicant.

The limitation of claim 5, 8-10 has been addressed above.

Conclusion

6.   The prior art made of record and not relied upon is considered pertinent to applicant's

disclosure.

Liang et al (US 7,356,367) is cited to teach computer based system and method of

visualizing a region using multiple image data sets is provided. The method includes acquiring

first volumetric image data of a region and acquiring at least second volumetric image data of the

region. The first image data is generally selected such that the structural features of the region

are readily visualized. At least one control point is determined in the region using an identifiable

structural characteristic discernable in the first volumetric image data. The at least one control

point is also located in the at least second image data of the region such that the first image data

and the at least second image data can be registered to one another using the at least one control

point

Kaufman et al (US 5,038,302) is cited to teach converting a continuous 3-D straight line

segment into a discrete set of voxels connected together in discrete 3-D voxel space. In another

embodiment, a method is provided for converting a continuous 3-D parametric polynomial curve

segment into a discrete set of voxels connected together in discrete 3-D voxel space

7.   Any inquiry concerning this communication or earlier communications from the

examiner should be directed to NANCY BITAR whose telephone number is (571)270-1041.

The examiner can normally be reached on Mon-Fri (7:30a.m. to 5:00pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Bhavesh Mehta can be reached on 571-272-7453. The fax phone number for the

organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent

Application Information Retrieval (PAIR) system. Status information for published applications

may be obtained from either Private PAIR or Public PAIR. Status information for unpublished

applications is available through Private PAIR only. For more information about the PAIR

system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR

system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would

like assistance from a USPTO Customer Service Representative or access to the automated

information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Andrew W. Johns/
Primary Examiner, Art Unit 2624

Nancy Bitar   06/09/2008